

CLAIMS

1  
2  
3 1. (Amended) A method of manufacturing drawn filaments which  
4 comprises heating original filaments supplied from a filament supply means by  
5 infrared beams, drawing the filaments to 1000 times or more under a tension  
6 provided by the own weight of the filaments and having degree of orientation of  
7 20.8% or more in view of birefringence for the drawn filaments.

8 2. (Amended) A method of manufacturing drawn filaments which  
9 comprises heating original filaments supplied from a filament supply means by  
10 infrared beams, drawing the heated filaments to 1000 times or more under a  
11 tension of 1 Mpa or less and having degree of orientation of 20.8% or more in  
12 view of birefringence for the drawn filaments.

13 3. (Amended) A method of manufacturing drawn filaments according  
14 to claim 1 or 2, wherein original filaments are heated by infrared beams within a  
15 range of 8 mm or less

16 4. [ ] A method of manufacturing drawn filaments  
17 according to claim 1 or 2, wherein the infrared beam is a laser beam.

18 5. [ ] A method of manufacturing drawn filaments  
19 according to claim 1 or 2, wherein filaments are delivered from a blowing duct  
20 before the filaments are heated by infrared beams.

21 6. [ ] A method of manufacturing drawn filaments  
22 according to claim 1 or 2, wherein a guiding tool for controlling the position of the  
23 filaments is disposed before the filaments are heated by infrared beams.

24 7. [ ] A method of manufacturing drawn filaments  
25 according to claim 1 or 2, wherein the original filaments are any one of  
26 polyethylene terephthalate, nylon and polypropylene filaments.

27 8. (Canceled)

9. [ ] A method of manufacturing drawn filaments

according to claim 1, 2 or 7, wherein the original filaments have a degree of orientation of 30% or more when measured in view of a birefringence and are drawn with an swelled portion larger than the diameter of the original filaments at the drawing start point.

10. [ ] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the obtained drawn filaments have a diameter of 5  $\mu$ m or less.

11. [ ] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the drawn filaments are heated in a heating zone disposed subsequently.

12. (Canceled)

13. [ ] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the drawn filaments are further drawn and then wound up.

14. [ ] A method of manufacturing non-woven fabrics

comprised of drawn filaments according to claim 1 or 2, wherein the drawn filaments are accumulated on a running conveyor.

15. (Amended) An apparatus for manufacturing drawn filaments

comprising supply device for original filaments, a guiding device to regulate a position of filaments before the original filaments are heated by infrared beams, an infrared beam emitter composed of heating the original filaments within a range or 8 mm or less and means to control a drawing tension, and composing to draw 1000 times or more the original filaments by tension provided by the own weight or tension of 1 Mpa or less.

16. [ ] An apparatus for manufacturing drawn filaments

according to claim 15, wherein the infrared beam emitter is a laser emitter.

- 1           17. [ ] An apparatus for manufacturing drawn filaments  
2 according to claim 15 or 16, wherein the laser beam is a carbon dioxide gas laser  
3 having a power density of 15 W/cm<sup>2</sup> or more.
- 4           18. [ ] An apparatus for manufacturing drawn filaments  
5 according to claim 15, wherein a heating device having a heating zone is provided  
6 to the drawing means and the drawn filaments are heated.
- 7           19. (Canceled)
- 8           20. [ ] An apparatus for manufacturing drawn filaments  
9 according to claim 15, wherein a drawing means is further provided to the  
10 apparatus for manufacturing drawn filaments.
- 11          21. (Amended) An apparatus for manufacturing non-woven fabrics  
12 comprised of drawn filaments according to claim 15, wherein it is composed that  
13 a running conveyor is disposed to the manufacturing apparatus of the drawn  
14 filaments, and drawn filaments are accumulated on said conveyor.
- 15          22. (Amended) An apparatus for manufacturing drawn filaments  
16 according to claim 15, wherein it is composed that a blowing duct is provided  
17 before original filaments are heated with infrared beams and original filaments  
18 are delivered through a blowing duct.
- 19          23. (Canceled)
- 20          24. (Canceled)
- 21          25. [ ] A super microfilament in which the drawn  
22 filaments according to claim 1 or 2 are drawn with a swelled portion larger than  
23 the starting filament diameter at the drawing start portion.
- 24          26. [ ] A highly oriented super micro filament in which the  
25 drawn filaments according to claim 1 or 2 are nylon 6 or nylon 66 and have the  
26 birefringence of  $35 \times 10^{-3}$  or more and the fiber diameter of 5  $\mu$ m or less.
- 27          27. [ ] A highly oriented super micro filament in which the

1 drawn filaments according to claim 1 or 2 are polyethylene terephthalate and  
2 have the birefringence of  $30 \times 10^{-3}$  or more and a diameter of  $5 \mu\text{m}$  or less.

3 28. ☐ ☐ ☐ A highly oriented super micro filament in which the  
4 drawn filaments according to claim 1 or 2 are isotactic polypropylene and have  
5 the birefringence of  $20 \times 10^{-3}$  or more and a diameter of  $5 \mu\text{m}$  or less.